

Claims

[c1] In a liquid extraction cleaner comprising;
a housing having front and rear portions,
a dirty fluid extraction system including
a suction nozzle;
an air-liquid separator for separating air from liquid and debris;
a recovery tank in fluid communication with the suction nozzle for collecting recovered liquid and debris; and
a vacuum source for drawing liquid and debris through the suction nozzle and for depositing them into the recovery tank;
a cleaning fluid dispensing system including
a cleaning fluid supply tank; and
a fluid distributor connected to the cleaning fluid supply tank for distributing cleaning fluid onto the surface to be cleaned;
the improvement comprising:
the housing has a rearwardly extending pocket at the rear portion thereof, the recovery tank is removably received at least partially within the pocket and the air-liquid separator is positioned within the recovery tank.

- [c2] A liquid extraction cleaner according to claim 1 wherein the housing has an integral handle between the front and rear portions thereof for carrying and operating the cleaner.
- [c3] A liquid extraction cleaner according to claim 2 wherein the cleaning fluid supply tank and the recovery tank have interengaging releasable fasteners to removably mount the cleaning fluid supply tank to the recovery tank.
- [c4] A liquid extraction cleaner according to claim 2 wherein the recovery tank further comprises an inlet duct and an outlet duct.
- [c5] A liquid extraction cleaner according to claim 2 wherein the recovery tank further comprises a sealable opening that is closed with a cap to seal the opening, the cap has an outward protrusion to facilitate removal of the cap from the opening and the cap protrusion matingly aligns with a recess in the housing when the recovery tank is seated properly seated within the housing pocket.
- [c6] A liquid extraction cleaner according to claim 2 wherein the recovery tank further comprises at least one flange and the cleaning solution supply tank has a channel that slidably receives the flange for removably mounting the cleaning solution supply tank to the recovery tank.

- [c7] A liquid extraction cleaner according to claim 6 wherein the at least one flange is on a top portion of the recovery tank and the cleaning solution supply tank channel is on a lower portion of the cleaning solution supply tank for removably mounting the cleaning solution tank to the recovery tank.
- [c8] A liquid extraction cleaner according to claim 1 wherein the cleaning solution supply tank and the housing have interengaging releasable fasteners that removably mount the cleaning solution supply tank to the housing.
- [c9] A liquid extraction cleaner according to claim 1 and further comprising at a forward portion of the housing a cartridge that is removably mounted to the housing, the removable cartridge further comprises at least one rotating agitation brush that is driven by a drive motor and wherein the rotation direction of the at least one brush is determined by the orientation of the agitation housing in the housing.
- [c10] A liquid extraction cleaner according to claim 9 and further comprising at least two rotating brushes.
- [c11] A liquid extraction cleaner according to claim 10 wherein the at least two rotating brushes rotate in the same direction.

- [c12] A liquid extraction cleaner according to claim 10 wherein the at least two rotating brushes rotate in different directions.
- [c13] A liquid extraction cleaner according to claim 9 wherein the orientation of the agitation housing to the housing determines the rotational speed of the at least one brush.
- [c14] A liquid extraction cleaner according to claim 9 and further comprising a clutch mechanism between the brush and the drive motor to disconnect the drive from the brush when the brush resistance exceeds a predetermined torque.
- [c15] A liquid extraction cleaner according to claim 14 wherein the clutch comprising a plurality of resilient fingers connected to one of the drive and the brush and that extend generally radially and a ring with a plurality of indentations the receive the resilient fingers.
- [c16] A liquid extraction cleaner according to claim 1 wherein the vacuum source further comprises a fan chamber defined in part by the housing.
- [c17] A liquid extraction cleaner according to claim 16 and further wherein the vacuum source comprising an im-

pellor to create working air flow and a motor for driving the impeller; and wherein the impeller has an inlet opening between the motor and the impeller, and wherein working air from the vacuum source is delivered to the impeller from an inlet between the motor and the impeller.

- [c18] In a hand-held liquid extraction cleaner comprising a housing;
- a) a dirty fluid extraction system including a suction nozzle,
 - b) an air-liquid separator for separating air from liquid and debris,
 - c) a recovery tank in fluid communication with the suction nozzle for collecting recovered liquid and debris,
 - d) a vacuum source driven by a whereby the vacuum source can draw liquid and debris through the suction nozzle and deposit them into the recovery tank,
 - e) a cleaning fluid dispensing system including a cleaning fluid supply tank, and
 - f) a fluid distributor connected to the cleaning fluid supply tank for distributing a cleaning fluid onto the surface to be cleaned;
 - g) the improvement comprising:
the cleaning fluid supply tank and the recovery tank have interengaging releasable fasteners to removably mount

the cleaning fluid supply tank to the recovery tank.

- [c19] In a hand-held liquid extraction cleaner comprising;
- a) a housing;
 - b) a dirty fluid extraction system including a suction nozzle,
 - c) an air-liquid separator for separating air from liquid and debris,
 - d) a recovery tank in fluid communication with the suction nozzle for collecting recovered liquid and debris,
 - e) a vacuum source comprising a motor and an impeller whereby the vacuum source can draw liquid and debris through the suction nozzle and deposit them into the recovery tank,
 - f) a cleaning fluid dispensing system including a cleaning fluid supply tank, and
 - g) a fluid distributor connected to the cleaning fluid supply tank for distributing cleaning fluid onto the surface to be cleaned;
 - h) the improvement comprising:
wherein the vacuum source further comprises a fan chamber defined in part by the housing.

- [c20] In a liquid extraction cleaner comprising;
- a housing having front and rear portions,
 - a dirty fluid extraction system including a suction nozzle;

an air-liquid separator for separating air from liquid and debris;

a recovery tank in fluid communication with the suction nozzle for collecting recovered liquid and debris; and

a vacuum source for drawing liquid and debris through the suction nozzle and for depositing them into the recovery tank;

a cleaning fluid dispensing system including

a cleaning fluid supply tank; and

a fluid distributor connected to the cleaning fluid supply tank for distributing cleaning fluid onto the surface to be cleaned;

the improvement comprising:

the cleaning fluid supply tank is removably mounted to the recovery tank.

[c21] A liquid extraction cleaner according to claim 20 wherein the recovery tank further comprises at least one flange and the cleaning solution supply tank has a channel that slidably receives the flange to removably mount the cleaning solution supply tank to the recovery tank.

[c22] A liquid extraction cleaner according to claim 21 wherein the at least one flange is on a top portion of the recovery tank and the cleaning solution supply tank channel is on a lower portion of the cleaning solution supply tank to removably mount the cleaning solution supply tank to be

removably mounted to the recovery tank.

[c23] A liquid extraction cleaner according to claim 20 wherein the cleaning solution supply tank and the housing has interengaging releasable fasteners that removably mount the cleaning solution supply tank to the housing.

[c24] A liquid extraction cleaner according to claim 20 wherein the recovery tank can be removed from the housing with or without the cleaning solution supply tank attached thereto.

[c25] A liquid extraction cleaner according to claim 20 wherein the cleaning solution supply tank can be removed from the recovery tank with the recovery tank mounted to the housing.

[c26] In a liquid extraction cleaner comprising;
a housing having front and rear portions;
a dirty fluid extraction system including
a suction nozzle;
an air-liquid separator for separating air from liquid and debris;
a recovery tank in fluid communication with the suction nozzle for collecting recovered liquid and debris; and
a vacuum source for drawing liquid and debris through the suction nozzle and for depositing them into the re-

covery tank;

a cleaning fluid dispensing system including

a cleaning fluid supply tank; and

a fluid distributor connected to the cleaning fluid supply tank for distributing cleaning fluid onto the surface to be cleaned;

the improvement comprising:

the vacuum source comprises an impeller to create working air flow and a motor for driving the impeller; the impeller has an inlet opening between the motor and the impeller, and wherein working air from the vacuum source is delivered to the impeller from an inlet between the motor and the impeller.

[c27] A liquid extraction cleaner according to claim 26 wherein the impeller has an outlet opening that is positioned distal to the motor.

[c28] A liquid extraction cleaner according to claim 27 and further comprising a fan chamber that is formed in part by the housing.

[c29] A liquid extraction cleaner according to claim 28 and further comprising an exhaust conduit having a vent opening formed in part by the housing.